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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

BEHIND THE SCENES IN SOIL SURVEYS

The laboratories Maps Publication Progress

Soil Stewardship Week

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

May 1968 Vol. 33, No. 10

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

COVER: A conservation farm in the Montgomery County Soil Conservation District, Md., illustrates good soil stewardship.

Surveys . . .

What is a soil survey?

More people than ever before are seeing and using them, as builders, engineers, and land-planning officials discover their value in urban as well as farm situations.

Every soil conservationist has been familiar with soil surveys throughout his career.

He has known the soil scientist walking alone across field and pasture, digging, studying, and mapping the soils.

He has studied the rough field sheets and exchanged information about the soils with the surveyor.

He has used the finished maps and heard the soil scientist explain their meaning to land users.

And he has welcomed the final publication containing all the maps of an area and the detailed descriptions and interpretations of all the soils—the end product, the "published soil survey."

Behind the scenes: What goes on between these normal contacts with the soil survey by its users?

Deputy Administrator Charles Kellogg gave his personal attention to the articles by Soil Survey staff members Alexander (p. 219), Orvedal (p. 222), Barnes with Editor McSweeney (p. 225), and Derr (p. 231) in telling the behind-the-scenes story of soil surveys.

Stewardship: The staff-written history of Soil Stewardship Week (p. 235) brings together for the first time information about the origins and progress of this national observance. The resulting perspective helps explain the growing significance of the affair.

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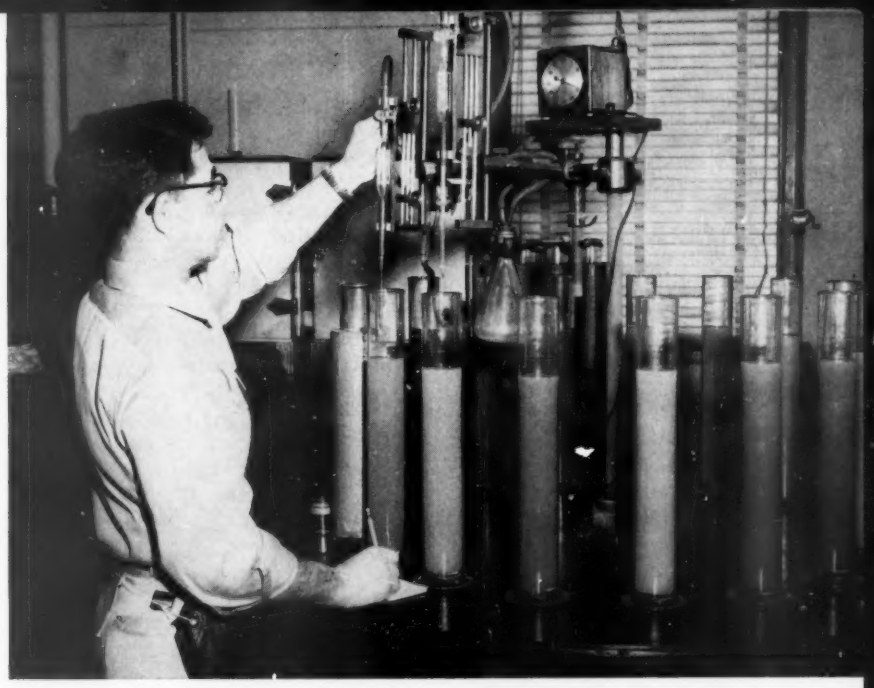


Determining the proportions of different-sized particles in the composition of soils is one of the major tasks of the Soil Survey Laboratory. The sand is first removed from a sample by sieving, then the remainder is suspended in water and allowed to settle in a cylinder. Since silt settles faster than clay, after a time only clay remains in the upper part of the column. The clay portion is removed with a pipette (right), the water evaporated from the two fractions, and the residues weighed.

The Soil Survey Laboratories

Scientists with beakers and balances support fieldmen in making and interpreting maps

By Lyle T. Alexander

Chief, Soil Survey Laboratories, SCS, Beltsville, Md.

Some of SCS's soil scientists work with beakers, balances, and microscopes, rather than with augers, shovels, and maps. They are the laboratory workers who weigh, measure, and analyze some 2,000 soil samples collected annually to help the fieldman in making and using soil surveys.

The Soil Conservation Service has a system of three laboratories that give support to field soil scientists. They are located at Beltsville, Md.; Lincoln, Nebr.; and Riverside, Calif. There staffs of scientists and technicians make more than 20,000 determinations each year to answer questions that fieldmen cannot answer for themselves.

The Soil Survey Laboratories give most of their attention to measuring the properties of soil that are to some degree permanent and that have value in classifying soils in the national system. Such properties as particle-size distribution, mineralogical composition, and base-exchange characteristics are useful for this purpose. This is in contrast to the measurement of fertility levels in individual fields that may be altered radically by a single large application of fertilizer.

In addition to helping to identify and classify soils, laboratory tests also provide information that helps to predict how specific soils will react to use. For example, the measurement of "COLE"—i.e., "coefficient of linear extensibility"—is a significant indicator of the stability of a soil for supporting buildings. And laboratory evaluations of the normal nutrient status of the various soils help to interpret their potential productivity.

Unusual problems in crop production or other aspects of soil management are sometimes solved with the aid of laboratory tests or by the joint investigation of laboratory and field scientists.

Thus, the soil survey laboratories of the Soil Conservation Service perform functions quite distinct from those laboratories of research institutions or of the "soil testing" laboratories of State colleges and commercial concerns that make specific fertilizer recommendations to farmers and gardeners. The SCS laboratories work hand in hand with the field staff in making soil surveys and providing soils information to farmers, builders, and other land users.

The settings of the three Soil Survey Laboratories are varied.

The Beltsville, Md., laboratory is in the Soils Building at the Plant Industry Station with spacious grounds. The Lincoln, Nebr., laboratory is on the upper floor of a downtown building. The Riverside laboratory is in three small one-story buildings on the grounds of the Agricultural Research Service Salinity Laboratory at the foot of Mt. Roubidoux, a few blocks from downtown Riverside, Calif. All three laboratories are equipped to do any work that is needed to answer specific questions.

When soil samples reach the laboratory they are prepared according to the kinds of determinations to be made. Usually there is a bulk sample of 5 to 10 pounds that is air dried and has the larger particles removed. The sample is then ready for such tests as those for particle-size distribution, base-exchange characteristics, organic-matter content, and acidity. Samples for microscopic study of the patterns of arrangement of soil particles and other special studies are kept in their natural uncrushed state.

When the results have been recorded in notebooks and necessary calculations are made, the findings are sent to the State office and the field soil scientist for checking for any possible errors or suggestions for any additional work that may be needed.

If the results are satisfactory, the information is available for immediate use. An interim report is issued for general use in the originating State and in areas that have the same or similar soils. Accumulated data for each State are published in a series of Soil Survey Investigation Reports that go to SCS field soil scientists and agricultural libraries and are available to soil scientists generally.

The laboratory results provide essential information to field soil scientists making soil surveys. The man in the field must make many on-the-spot judgments of texture, mineral composition, and other properties of soils that enable him to recognize different kinds and draw their boundaries on a map. Such judgments are not always an adequate basis for technical soil descriptions, however, and they cannot be made consistently without comparison to some standard of objective determinations by laboratory methods.

For example, an experienced soil scientist can feel a sample of soil and estimate the amount of clay present, but only the laboratory can determine how much is actually there. Since so many determinations are needed in mapping, field evaluation must serve in the majority of instances. But to have good results, the field soil scientist needs to check his results against samples for which particle-size distribution has been determined in the laboratory.

Perhaps the most common chemical tests used by the field scientist are those for acidity and for carbonates. Both are made in the field because the data are needed for immediate decisions on soil classification or on the nature of the soil being studied. The fieldmen can evaluate soil acidity with a test kit, but laboratory analysis is necessary to determine the kinds of bases present and the degree of base saturation that is the reason for the acidity.

The field soil scientist can sometimes recognize quartz, feldspar, and mica in a soil sample, but laboratory tests are required to determine the percentage of weatherable materials. This information is necessary for the proper placement

In X-ray fluorescent analysis, a small sample of soil is placed in position and bombarded with high-energy X-rays. The treatment causes it to emit fluorescent X-rays whose wavelengths are dependent on the chemical elements present in the sample.

In the study of the mineralogical composition of soils, thin sections are examined and photographed with a petrographic microscope.

of some soils in the classification system.

The COLE measurement is a good example of a laboratory determination that is necessary for interpreting the suitability of many soils for various uses. It tells how much the natural structural units of the soil—technically, the "aggregates" or "clods"—swell on wetting and shrink on drying. The COLE value indicates how stable a soil will be as a foundation for buildings. It also measures the tendency of a soil to seal at the surface and cause excessive runoff, even with moderate rainfall.

For making COLE measurements it is necessary to take, very carefully, fist-sized blocks of undisturbed soil into the laboratory. The blocks are dipped in plastic and dried at the sampling site to preserve their natural structure in transit. Then they are packed in ice-cream cartons with a cotton bedding for transport.

In the laboratory, the volume changes of each natural clod are measured as it is allowed to wet and dry. These measurements are made for each soil horizon. From the thicknesses of the various horizons, a summation can be made of the amount of rise and fall of the whole soil to any appropriate depth. The calculations are made on a properly programed computer.

Special laboratory determinations are used to explain the reactions of certain problem soils and to overcome local difficulties in soil use and management.

For example, some soils in the Southeastern Coastal Plain are notoriously unproductive. Trees grow very slowly on these soils, and rarely have they been farmed. Somehow early farmers sensed, or found by trial and error, that they should be left in timber.

These are very old soils, and laboratory tests show that they are so low in exchangeable bases, especially calcium, that plants cannot grow normally unless they get substantial amounts of fertilizers. The problem of using these soils is essentially the same as for large areas of old soils in the Tropics. The plant nutrients are so scarce that few roots penetrate much below the surface, and they are unable to use the moisture stored in lower soil.

Some of the soils of the Eastern Highland Rim in Coffee County, Tenn., have a mantle of silt several feet thick. Until recently this was assumed to be a windblown material, but a logical source for so much windblown silt was not apparent.

A restudy of the Sango and Dixon soils in the fall of 1967 led to the hypothesis that the silt was derived from limestone that once was extensive in the area. The laboratory determined that the silt particles were indeed of the same kind and size as those found today as an impurity in remnants of the limestone. It was concluded that the silty material was left from the impurities in the limestone and was not something blown in by wind. It was found also that it took a 20-foot thickness of the limestone to leave as residue a foot of the silty soil material.

The SCS Soil Survey Laboratories help to pinpoint the causes of soil differences. They measure many of the properties that cannot be evaluated by the field soil scientist. By working jointly to diagnose problems, to collect appropriate soil samples for critical measurements, and to interpret the results, both the laboratory scientists and the field scientists learn far more than either group could do alone. ♦

Small scale maps for the big picture

By Arnold C. Orvedal

Assistant director, Soil Survey Investigations, SCS, Washington, D. C.

The demand for small-scale soil maps, that show a whole county or larger area on a single sheet, is increasing sharply, partly because of the new emphasis on community and regional planning.

Small-scale soil maps present general views of soils in contrast to detailed views given by large-scale maps like those in published soil surveys.

There is an especially strong demand for maps at scales between 1:125,000 and 1:250,000, roughly 2 to 4 miles to the inch.

Maps at these scales usually are made by generalizing from large-scale, detailed soil maps. Because of current needs, some small-scale maps are based on field reconnaissance coupled with interpretation of topographic maps, geological maps, airphotos, and other sources of information for areas still lacking detailed soil surveys.

Soil associations

Because individual kinds of soils commonly occur in small rather than large areas, nearly all map units on small-scale maps are made up of two or more kinds of soil. These map units are called "soil associations," meaning that the soils are geographically associated. Adjacent soils are not necessarily similar; more commonly they are contrasting in characteristics that influence their use.

The two diagrams with a portion of the generalized soil map of Jefferson County, Ky., shown on the following page, illustrate the patterns of soils occurring in two broad areas of the county.

Let us examine in some detail the Crider-Corydon Association, which occupies area 6 of the map. Although simpler than many, it illustrates what is meant by the term "soil association."

The Crider soils lie on broad, gently sloping uplands between the drainageways. The Corydon soils occupy the rather steep slopes between the uplands and the valley bottoms. These contrasting soils occur in a regularly repeated pattern of distribution. Such repeating soil patterns are characteristic of properly defined soil associations.

The association's name

Since Crider and Corydon are the principal soil series of the association, their names, joined by a hyphen, give the name of the association: Crider-Corydon. The diagram shows slope phases within both series. Thus, this map unit is an association of phases of these series.

The diagram also indicates a small area of Huntington soils, which makes up a small but repeating component of the association. Small, commonly irregular, areas of other kinds of soil, not shown in the diagram, may also make up regular or erratic parts of the mapping unit.

The published Soil Survey of Jefferson County explains that the Crider series makes up about 70 percent of the association as mapped and the Corydon about 15 percent. Minor areas of other kinds of soil, including Huntington, make up the remaining 15 percent.

The Crider soils are deep and gently sloping; the Corydon soils are shallow and rather steep. Obviously, the principal soils in this map unit have highly contrasting combinations of characteristics that determine their responses to management for different purposes.

The Crider soils of less than 6 percent slope have only *slight* soil limitations for use as building sites for dwellings with septic tanks; those between 6 and 12 percent slope have *moderate* soil limitations. All the Corydon soils have *very severe* limitations for this use, and so do the Huntington soils.

Limitation ratings of *slight, moderate,* and *severe* are commonly used in soil survey interpretations. In some areas the severe class is subdivided into severe and very severe where the differences are significant. The criteria for separating severe from moderate classes remain the same in either event.

Limitation range

In our example soils with limitations that range from slight to very severe lie within the map unit shown as Crider-Corydon. With this range, how can interpretations about the map unit be set forth clearly? Several approaches have been tried, some more satisfactory than others, but none completely satisfactory.

First, the description might simply indicate the dominant interpretive rating or the one of greatest extent. In our example, such a rating would be slight, or slight to moderate. The fact that about 15 percent of the soils have very severe limitations would be left for the reader to discover in the detailed text description.

A second approach is to suggest an average rating. This is less satisfactory than the first one because if half of a soil association has a rating of slight and half severe, the average would be moderate, and such a rating could be quite misleading.

General soil groupings used to portray landscape patterns for regional planning

A third approach is to indicate the full range of limitations, which, for the Crider-Corydon association, is from slight to very severe. This is unsatisfactory because many soil associations include kinds of soil that range from one extreme to another. Many unlike soil associations would not be differentiated.

A modification of the third approach is to give the range in ratings and also to specify the rating that applies to some large percentage, say 50 percent or more, of the soils in the association. For our example, the interpretation then would be: "Slight limitation more than 50 percent; range, slight to very severe."

By further elaboration of this approach, the percentage of the area of the Crider-Corydon association in each limitation class could be given as follows: "Slight, 55 percent; moderate, 15 percent; severe, 0 percent; very severe, 15 percent; undetermined, 15 percent." This convention gives the facts reasonably well but fails to identify which kinds of soil have slight, moderate, or very severe limitations.

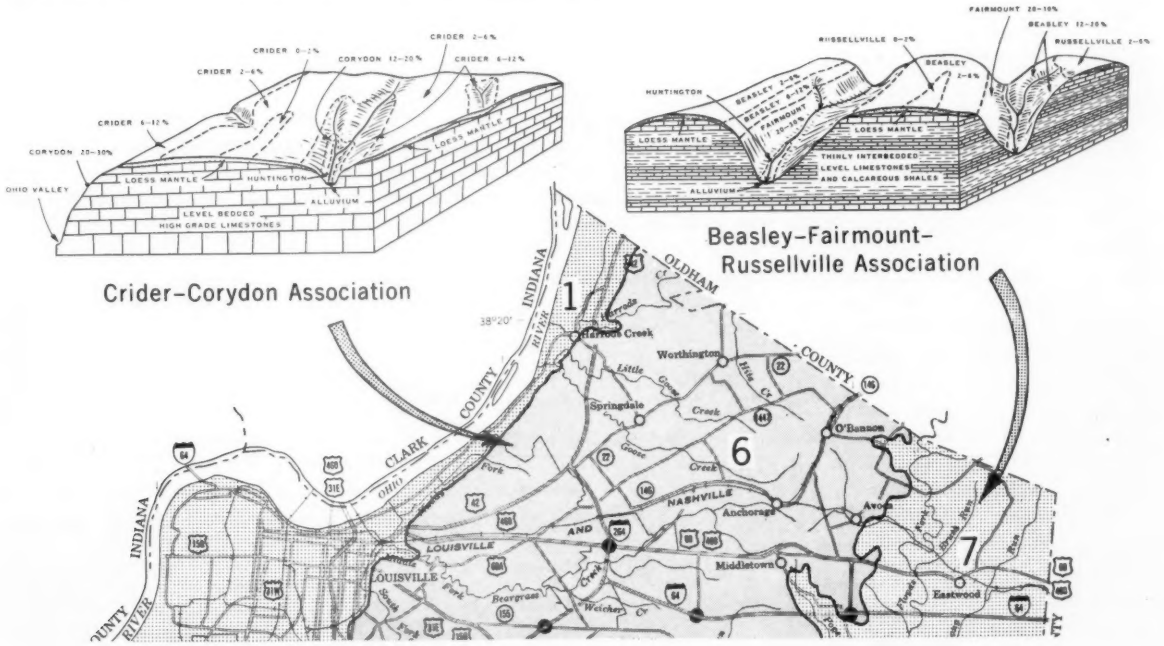
Superficially, it might be argued that because individual kinds of soil in associations cannot be delineated at the small scale of the map, the reader should not be burdened with the names of those soils having particular limitations. Yet the principal components of soil associations can be readily distinguished in the field. The user of the map needs only to learn the descriptions of the few kinds of soil in the association covering the land that interests him specifically. He can easily visualize, even without the aid of a diagram, that the Crider soils are deep and gently sloping and the Corydon soils shallow and rather steep. These characteristics are clearly brought out in the printed soil descriptions and are easily recognized on the ground.

A peg to hang it on

People who use soil interpretations find that the soil names are useful pegs on which to hang a vast amount of information, both that included in published soil surveys and that which they see for themselves in the field.

A simple table like the example on page 224 can be used to set forth the main facts about the specific kinds of soils in an association. If the table is not too large, it can be placed on the map sheet along with the legend, or, it can be a separate sheet or a table in a special report for the map. The format for such a table can be adjusted to meet the local needs, both as to the degree of refinement and the relevant kinds of interpretations.

The block diagrams show the relationships of different soils to each other and to bedrock and topography in each of two soil association areas in a portion of the small-scale general soil map of Jefferson County, Ky. The complete soil map, on a scale of 3 miles to 1 inch, appears on a double sheet in the published soil survey. The block diagrams illustrate text descriptions of the soil associations. Five other associations shown on the complete county map are similarly illustrated and described.



In addition to the small-scale soil map and its interpretations, there is a growing interest in separate maps showing individual interpretations at the same scale.

Such interpretive maps must be carefully designed and explained to avoid misleading the users. An interpretive map for one purpose can be wholly misleading for a different purpose. For example, many kinds of soil with only slight limitations for farming have severe limitations for housing, and vice versa.

Many users prefer colored interpretive maps. It is common practice to use the familiar colors of a traffic signal—green, yellow, and red—to indicate slight, moderate, and severe limitations. The same or a darker red can be used for very severe.

Let us see how this suggestion would be applied to the Crider-Corydon soil association in the diagram. If we need to represent by color the limitations for residential housing with septic tanks, what color should be chosen when we find kinds of soil with slight, moderate, and very severe limitation within delineations of this association?

A joint understanding

Rules can be established. And they need to be agreed on in consultation with the people expected to use the interpretations.

Some users may be concerned mainly with the extent of soils having slight limitations, and others with those having severe ones. In some localities, areas are colored red if the extent of soils with severe limitations for a particular use exceeds 30 percent of the total. The reasoning is that for certain decisions the soils with severe limitations exert a controlling influence if they make up more than 30 percent of the pattern.

Such a minimum figure might vary according to the kind of interpretation, the availability of land, and the judgments of local planners about what degrees of limitations are critical. The criteria agreed on should be set forth either in the legend or in an explanation near the legend.

Also, judgments about critical limits may change as experience is gained and technological advances are made. Maps colored according to this system, while highly effective for the moment may soon be obsolete.

Besides interpretive maps oriented to specific uses, there are single-factor maps that show one kind of soil characteristic, such as slope, drainage condition, stoniness, or shrink-swell potential. In some localities, where certain soil characteristics have fairly consistent relationships to several soil uses, such maps can be helpful.

Single-factor maps may be deceptively simple, however, since the effect of any one soil characteristic usually depends on others in the combination. For example, susceptibility of soils to erosion may not be well correlated with soil slope; it may also depend on permeability of the subsoil and of earthy materials beneath.

Occasionally two sets of interpretations or soil characteristics can be shown on a single map, but rarely three, because of the resulting complexity and difficulty of map reading.

Many would like to see combined interpretations of several subjects. Such maps can be made for only very broad uses in community planning, and they need a good deal of testing prior to use. For the present, one map for each interpretive subject is safest.

This means that the number of maps is as large as the number of needed interpretations. Where many interpretations are involved, costs are high and wide publication of such comprehensive sets of interpretive maps is unlikely. But a few sets of interpretive maps can usually be hand-colored for use by planning commissions and key offices.

A basic small-scale soil map accompanied by a comprehensive interpretive table is a highly practical combination. This is one step short of individual interpretive maps, but it provides the essential information and permits the using office to have special maps colored according to limitations to meet its own planning needs. ♦

Sample table of soil interpretations

Soil association	Components	Proportion of association	Selected soil characteristics: Depth to bedrock	Selected soil characteristics: Shrink-swell potential	Soil limitations for selected nonfarm uses: Residential development: With septic tanks	Residential development: With community sewerage	Highways	Wildlife sanctuaries	Intensive play areas
		Percent	*Feet*						
Crider-Corydon	Crider soils, 0 to 6% slopes	55	5	Moderate to high	Slight	Slight	Moderate	Slight	Slight
	Crider soils, 6 to 12% slopes	15	5	Moderate to high	Moderate	Moderate	Moderate	Slight	Moderate
	Corydon soils, 12 to 20% slopes	10	1–2½	Moderate to high	Very severe	Severe	Very severe	Moderate	Very severe
	Corydon soils, 20 to 30% slopes	5	1–2½	Moderate to high	Very severe	Very severe	Very severe	Severe	Very severe
	Other soils	15	—	—	—	—	—	—	—

The soil survey comes inside

Extensive indoor staff backs the field soil scientist to produce a valuable published document

By Byron A. Barnes and Charles A. McSweeney

Soil scientist, Soil Survey Interpretation Division, and editor, Soil Survey Editorial Unit, SCS, Hyattsville, Md.

In the editorial office, each soil survey manuscript is assigned to an editor who directs its progress through the entire process of preparation for the printer.

Although the soil map, showing what kind of soil is where, is usually the focus of interest in a soil survey, there is more to a soil survey than maps.

The laborious job of the soil scientist walking over the land, digging holes, taking samples, and recording his findings on a map is only the beginning of the painstaking process of producing a published soil survey.

The farmer, the builder, the land use planner or conservationist using the soil survey is seldom aware of the additional technical work by soil scientists, cartographers, and editors that has wedded a wealth of factual information to the finished maps.

Yet it is this additional process of gathering facts, verifying and cross-checking them, and expressing them clearly that makes the finished product the useful document it is.

Published soil surveys are regularly recognized as authoritative evidence in courts of law. And estimates of benefits from soil surveys range from $40 to $175 for each dollar of cost, assuming that the surveys are useful for at least 25 years.

Since 1900, soil surveys have been made and published for nearly 1,000 counties or other geographical areas in the United States. Early users were farmers, ranchers, and foresters. In the late 1920's and especially during the second World War, engineers began to use them, especially for planning highways. In recent years new groups have learned to appreciate their value—public planners, water users, builders, and developers—especially those interested in community development in rural areas and near urban centers.

Let's explore some of the things in addition to field mapping that have to be done to make the product valuable to this wide range of users.

Since our knowledge about soils has been growing rapidly, and many new kinds of soil problems have arisen, the soil scientist must be alert as to how his factual information may be interpreted by many kinds of users.

So, as he makes the survey, he keeps in touch with agronomists, foresters, engineers, conservationists, planners, and other specialists. He keeps notes on the observations he makes on how the different soils behave under different uses and varying types of management.

He asks himself: Would this soil be suitable for septic tank filter fields? How would it suit for building foundations? Would it corrode underground pipe? How about its use for certain forms of recreation? He tries to find answers to such questions and makes notes.

As the soil scientist examines and studies the soils, field by field and farm by farm, questions invariably arise that he cannot answer and he

must turn to the laboratory for supplementary data. Through field and laboratory studies, the kinds of soil within the survey area are defined and described. Each kind of soil is identified and correlated in terms of a nationwide system of soil classification. Through the use of this system each kind of soil is called by the same name wherever it occurs in the country.

The soil scientist records the boundaries of the different soils on aerial photographs. These, when complete, are called soil survey field sheets. Boundaries on the field sheets are transferred, in the cartographic unit, to an aerial mosaic base that has been corrected for variations in scale.

Text for map

The soil map can be useful only if accompanied by a text that describes the soils shown and how they may be used. The soil scientist compiles this kind of information, along with descriptions of the different soils, as he makes the survey. This information becomes the manuscript for a published soil survey.

Manuscripts assigned for editing in fiscal 1968 averaged 334 double-spaced typed pages, 56 pages of tables, two to four three-dimensional diagrams, 18 photographs, and 100 or so survey field sheets.

Lead time for maps

Cartographic work on the map begins at least 3 years in advance of publication in order that the map may be prepared and the soils correlated by the time the manuscript is ready.

Manuscripts for publication are first reviewed by a soil scientist for technical content and accuracy. Additional information needed is requested from the author. Then the manuscript is assigned to an editor.

The editor wants to help the reader clearly understand what is written in the publication, and to quickly find the information he wants. His general guides are short words, short sentences, and short paragraphs. The editor retains technical terms for which there are no popular equivalents and defines them in the glossary.

The editor also helps the author in checking for accuracy. Errors can occur at any stage of publication. Keeping map symbols in the text in agreement with those on the soil map is only one example. Symbols can be erroneously changed when the author reviews the edited manuscript, when the printer sets it in type and delivers the galley proof, and again when the printer prepares page proof. The editor has to look at all stages of the process.

The editor checks a draft copy of the detailed soil map against the edited copy of the text. The text must agree, or be made to agree, with what is shown on the map. Ordinarily the author first sees the soil map and text together when he receives a copy of the published soil survey.

The precise word

More complicated is checking to assure uniform use of the author's technical vocabulary and the standard technical terminology of soil

Soil map symbols are transferred (left) to the manuscript from the original survey sheets after being converted through a correlation legend to their published form. A mosaic of map sheets tacked to the wall (right) facilitates checking for agreement with details mentioned in the text.

survey. The need for precision increases as more information about soils is prepared for computers. Computers will not forgive if the soil scientist writes "weak fine platy" in one place and "weak thin platy" in another.

Checking and reorganizing for consistency in style and logical presentation is another time-consuming job of the editor. Readers use a soil survey in somewhat the way they use an encyclopedia. Descriptions of the soils need to be arranged in such a way that a reader can find the same kind of information at approximately the same place in all the soil descriptions. The same applies to groups of soils; for example, the land capability units for farmers, the woodland groups for those who own or operate woodland tracts, and the engineering groups.

Editorial staffs check literature citations to be sure that they are accurately listed and spelled and are currently available. They see that illustrations are functional and will reproduce well. They obtain clearance from other agencies. They mark the manuscript with instructions to the printer on kind and size of type, locations of legends and footnotes, headings, and tables.

Most important function

The most important function the editor serves is to see that the author conveys to the reader what he intended to convey. Putting in punctuation marks and complying with printing office style are the least important things. The author's main concern is the message about the soil. The editor's main concern is getting the information into form for the user.

After editing, the manuscript is reviewed by SCS soil scientists and by cooperating agencies. Corrections made by authors are again reviewed by the editor and the final manuscript is then ready for printing. The last job is checking galley and page proofs. ♦

A conservation profile . . .

Missouri's first woman supervisor

"She isn't here, she's down in the field mowing hay." That's the answer Ben Feldewert got when he called to ask Mrs. Betty Broemmelsiek to be a district supervisor for the St. Charles Soil and Water Conservation District in Missouri. Ben is chairman of the board.

Later he did talk to her, however, and now Betty is Missouri's first woman supervisor. Her appointment was effective July 1967.

The title is added to an already long list of affiliations. Basically, she considers herself a farmer—farmerette, if you will. A herd of 140 registered Angus cattle, a flock of 85 sheep, and the work they create qualify her for the position.

She is also a teacher in the St. Louis schools. Her farm provides an ideal outdoor classroom for her fourth, fifth, and sixth grade students, who think milk comes from a carton at the supermarket. Since starting the study tours 10 years ago, Betty has had as many as 400 kids at a time watching cows being milked and "fishing for fun" in the ponds on the farm.

Five hundred and twelve acres of mostly grass and ponds allow the kids to see conservation practices in action on the land instead of just reading about them in a book.

Betty and husband Jack started their "classroom" farm at the end of World War II with 45 acres. The latest addition was a 170-acre farm bought in 1966. They shocked the original owner by starting a parade of lime and fertilizer trucks to the pasture before he had even had a chance to move away.

Some conservation work had already been done on the farms they have bought, but the Broemmelsieks have made improvements. Since becoming cooperators with St. Charles District in 1961, they have seeded 100 acres of fescue, timothy, and alfalfa-ladino-grass mixtures for pasture and hay. They improved the terraces and waterways, built a number of new ponds, and plan to build more. A 12-acre pond was under construction while Betty was attending her first annual meeting of the Missouri Association of Soil Conservation District Supervisors at Cape Girardeau.

Mrs. Betty Broemmelsiek.

Betty is a 1939 psychology graduate of Oberlin College and Washington University. Jack is president of a drug package manufacturing firm in O'Fallon, Mo.

"That's in the daytime," said Betty. Nights and weekends he helps her farm. They have four children. One daughter teaches French in Illinois, another is a student at the University of Wyoming, and a third is at home looking after the horses while she finishes high school. Their son is in the Marines.

Since the farm operation has grown so large, a man and his wife help with the enterprise. Asked if the hired man does the tractor driving, Betty quickly replied, "Well—he drives his tractor and I drive mine." ♦

A lot of knowledge in a hurry . . .

A work project in Algiers

By Charles M. Hood
State soil conservationist, SCS, Columbia, Mo.

Through your interpreter you have just been told by the local officials that 500 to 1,000 people in the village are on relief. They want to put them all to work in the next few days.

If you are a soil conservationist assigned to direct a work and conservation project in a foreign land, as I was in Algiers in 1963, you will realize that you have your work cut out for you.

These people are to install soil and water conservation practices, but they have never seen a terrace or a water-detention dam. Your heavy equipment will consist of mattocks, tampers, shovels, and perhaps a few wheelbarrows.

The project work area may vary from a few hundred to a few thousand acres in size. Included in these large Government-owned tracts will be several privately owned areas of small irregular tracts. The individual work projects will have to be within 5 to 10 miles of the village, for the workers must walk to work.

You are not familiar with the language and customs of the people, and you have only read about the climate, soils, and crops. You will acquire a lot of knowledge the hard way and in a hurry.

For example, the layout of a terrace or diversion must be done well in advance. On your first job, naturally you will mark out the work with stakes. When you go back the next morning and find every stake gone, you will need to adjust your tactics.

You realize that fire wood is very scarce, and that you are not going to change the customs of the land. You will find that digging holes makes equally good markers.

If it were necessary to stay strictly with Civil Service procedures, there would be some very interesting job descriptions. For example, the man whose only job requirement is to crack a whip every few minutes. This is to frighten away hungry birds that otherwise would quickly devour all the seed being planted to establish a plant materials nursery and the little seedlings that are the first results of your work.

As the work continues, the people begin to grasp the importance and significance of soil and water conservation measures. The many frustrations and misgivings fade into the background as the villagers begin to appreciate and make use of the various practices.

The soil and water conservation demonstration project carried out in Algiers from 1963 to 1965 was one of the first in which the technical skills of the Soil Conservation Service were provided as a unit or team to help an underdeveloped country help itself. It was also unique in that the Algerian Government put up half the cost of this $6 million project. The Algerian Government paid the workers $0.70 to $0.90 a day, and the United States provided each man the equivalent amount in surplus wheat and cooking oil.

The project objective was to put as many hungry people to work as possible and to use their labor to set up demonstration conservation projects. Ranging in age from 14 to more than 80 years, the Algerian laborers accomplished an unbelievable amount using only mattocks and shovels. In a few instances, wheelbarrows were avail-

Laborers dig a ditch before laying tile to bring water from the reservoir to a nearby village for domestic use.

Tree seeds planted in plastic bags are carefully watered by hand at the Orleansville nursery, one of three established in Algeria.

Village women obtain pure clean water from a storage basin constructed in connection with a spring development. Water previously lost during the night is now stored in a nearby reservoir and piped to the basin.

able. Thirty-seven different types of conservation practices were established on 53 separate project areas.

This is a land that has been farmed for centuries. Each year there are fewer acres capable of producing the crops needed to feed the increasing population.

The 225,000 acres of detailed soil surveys, made by the Soil Conservation Service, confirmed the seriousness of the soil and water losses in all areas. The completion of 868 grade-stabilization structures; 283,410 feet of grassed waterways; 70 miles of terraces and diversions; 49 acres of bench leveling; the planting of 600 acres of fruit trees; 4,000 acres of forest trees; and the growing of 739,000 trees for planting stock best depict the magnitude of this hand-labor project.

The water conservation and development projects were most appreciated by the Algerian people. Villages were benefited by water from the 18 springs, 30 water-control structures, 10 water reservoirs, and many irrigation systems.

As in all countries, it is impossible to estimate the value and importance of conserving the soil and water resources in Algeria. This need is particularly urgent in countries that are now short of food, fiber, and water. The constantly increasing population further magnifies this problem, and that we cannot expect peace and stability in a nation of hungry people.

Three bushels of wheat, 9 pounds of cooking oil, and 12 dollars in cash seemed to be a very small reward for a month's hard work under a hot desert sun. But this surplus U. S. wheat fed several hungry people, and the physical work involved nourished one other important element—an Arab's pride.

The participation in the conservation of their Nation's resources removed some of the aspects of a relief program. The technical assistance provided by the Soil Conservation Service pointed the way for helping a nation help itself, now and in the years ahead. ♦

Conservationist earns honors and awards

A life-time conservationist, Andrew Carmon, Mayfield, Ky., has earned honors and awards through the years for his efforts and interest in conservation.

In 1964, he received a Master Conservationist Award from the Graves County Soil Conservation District. His first award was in 1948 when he received $100 and a trip to Hancock County, Ga., to attend the Jamboree Celebration as State winner in the southwide Soil Conservation Jamboree Contest.

Mr. Carmon bought his first 40 acres of land in Graves County in 1923, worked at public works until 1932, and that year he and his wife moved to the farm and started farming.

He planted 7 acres of corn the first year, between the gullies.

"My yield of 5 bushels an acre was a great surprise to my neighbors," he said. "They didn't think I could get my seed back."

A cooperator with the Graves County District in 1945, Andrew later started a program of terracing and contour cultivation. This practice met with so much favor, he began doing custom terracing for his neighbors. The next few years he terraced about 80 acres of land.

Andrew Carmon stands in a narrow contour strip of tobacco between strips of grass.

In 1966, he planted his tobacco in contour strips with a strip of grass left between each two strips of tobacco. Today Mr. Carmon owns 82 acres of land free of gullies.

Mr. and Mrs. Carmon are active members of the St. James A. M. E. Church, Carmon serving as a steward and a member of the board of trustees for many years.

The Carmons have two adopted children, and it is partly for them that the Carmons are still trying to use the vesy best conservation practices for all their land.—H. F. SMITH, *soil conservationist, SCS, Mayfield, Ky.* ♦

Remote sensing aids agriculture

Remote sensing from orbiting satellites may yield much agricultural data of value, reports the Economic Research Service, USDA.

Photographic sensors now exist which potentially could perform many agricultural survey tasks from space platforms: reconnaissance surveys of major land use, soil, water resources, range conditions, and cropping practices.

Agriculturists have used panchromatic aerial photography for many years for mapping and for studies interpreting land use and land capability. Scientists are now expanding this technology.

One technique, multiband sensing, records, at the same time, energy from several different portions of the photographic part of the spectrum. Imagery is normally formed and visually interpreted, but progress in automatic interpretation will eliminate these steps.

Another technique, multispectral sensing, is similar but uses thermal infrared and other nonphotographic parts of the spectrum as well as the photographic part. ♦

Cooperative Soil Survey fixes on year 2000 as target date for completing mapping

By Louis E. Derr

Assistant director, Soil Survey Operations, SCS

The year 2000 has been set as a target date for first-time completion of mapping in the National Cooperative Soil Survey.

The current survey status summary shows 1½ billion acres to be mapped in the next 33 years—more than twice the acreage adequately covered up to the present.

The objective is to survey all the land in the United States, the Virgin Islands, and Puerto Rico, except major metropolitan centers, restricted military installations, and parts of Alaska. This amounts to a total of 2,262 million acres, of which 685 million has been mapped to meet current standards.

About 47½ million acres will have to be mapped annually to complete the "once over" survey by the year 2000. That is about the rate of mapping attained in fiscal year 1967.

A mounting need

The demand for new soil surveys to guide community and industrial development is creating unmatched requirements for soil survey operations. In fiscal year 1967, 254 special soil survey reports with soil maps and interpretations were prepared to fill local requests. Special reports are planned for 433 areas in fiscal 1968, and 580 requests have already been received for fiscal 1968.

Local governments are responding with larger contributions to survey funds. The local non-Federal input has increased steadily over the past several years. In the entire country in fiscal year 1964, about $194,000 of local non-Federal funds were made available to SCS for soil surveys. The amount available for 1968 is about $775,000. Most of these funds are provided to accelerate soil surveys in rural and rural-urban transition areas of expanding population and industry.

The table shows the planned intensity of mapping and the remaining job to be done. It gives only a rough clue, however, to the character of the most pressing needs.

A joint plan

In each State, the SCS State conservationist confers annually with State, Federal, and local groups to assemble information for setting priorities for completing soil survey fieldwork and publication of the results. On this basis, target dates and financial plans are made to develop both a long-range and an annual plan for each soil survey area.

The detailed planning of priorities and of designs for individual soil surveys is done within each State in accord with national standards for soil classification, interpretation, and other procedures.

Consideration is given to the requirements of operations programs and technical assistance in the various areas, to local interests, and to related factors so that the resulting surveys will serve the greatest need, especially in places where land use adjustments are critical and private and public investment risks are high.

Although the Soil Conservation Service has national leadership for soil survey work in the Department of Agriculture, the State agricultural experiment stations and other State, Federal, and local agencies contribute to the work and advise on methods and priorities in the National Cooperative Soil Survey. ♦

Status of soil surveys, June 30, 1967

	To map	Mapped	Remaining to be mapped	
	Acres	*Acres*	*Acres*	*Percent*
Detailed soil surveys:				
High intensity	48,682,174	30,111,729	18,570,445	38.1
Medium intensity	1,229,389,339	542,538,168	686,851,171	55.8
Low intensity	406,431,048	95,546,593	310,884,455	76.4
Total detailed	1,684,502,561	668,196,490	1,016,306,071	60 3
Reconnaissance soil surveys	578,054,686	16,926,654	561,128,032	97.0
Total detailed and reconnaissance	2,262,557,247	685,123,144	1,577,434,103	69.7

Irrigation structure repairs a washout

Loss of a summer's supply of water and $10,000 worth of hay when an irrigation flume gave way spurred the Big Horn Cattle Company to realine the ditch and install a 48- by 72-inch bituminous coated arch pipe with concrete inlet and outlet structures to span the critical area.

The Soil Conservation Service designed the structure for Carl Hanson, manager of the company which is a cooperator with the North Park Soil Conservation District, Colorado.

A leak in the 400-foot wooden flume had saturated a slick ledge of shale causing the old ditch to give way and slide down the mountainside.—DUANE L. JOHNSON, *work unit conservationist, SCS, Walden, Colo.* ♦

Cranberries are gathered mechanically from flooded beds.

Sauce for the economy . . .

Cranberries and conservation give a boost to northern Wisconsin

By Jack Densmore
State soil conservationist, SCS, Madison, Wis.

Cranberries, once the traditional dish for Thanksgiving and Christmas, are winning a regular place on American family menus.

Cranberries have, therefore, become an extra special crop for folks who have what it takes to produce them. Among the lucky ones are the owners of wet, extremely acid soils in a generally underdeveloped region in northern Wisconsin.

According to latest figures, Wisconsin cranberry producers are second in the Nation, putting 400,000 barrels of fruit on the market each year. Success of this Wisconsin "specialty crop" is a source of pride and a strong bond of interest for growers in the region. They see this growing industry providing a needed economic boost to their communities.

Typical of the growers who are riding the crest of the current wave of demand for the crop is Tony Jonjak, a long-time cooperator with the Sawyer County Soil and Water Conservation District.

Buying some tax-delinquent marshland in Sawyer County, Jonjak started his own marsh in 1939. His first beds were cleared, ditched, and planted with just a "strong back," handtools, and a wheelbarrow. From this small, pioneering start, Jonjak's "home" cranberry plantings have grown to 50 acres. Tony and his son Paul have also developed 45 acres in neighboring Douglas County.

In the past 5 years, Jonjak, with the assistance of SCS Work Unit Conservationist Robert Hoene, has been updating and expanding his cranberry beds. Water-conservation measures are an important part of this improvement.

SCS provides onsite assistance in planning and installing needed conservation practices. Extension Service specialists make recommendations on improved varieties and cultural measures.

Like most cranberry marshes in Wisconsin, Jonjak's development involves a water-storage reservoir with a canal leading from the reservoir to a series of sections or beds 2 to 4 acres in size. The beds are diked, carefully leveled, and pro-

Sorting cranberries provides seasonal employment on many northern Wisconsin farms.

vided with water-control structures to allow flooding and draining.

A pumping station and ditches return tail water from the beds to the storage reservoir, making it available for re-use.

Jonjak plans to add sprinkler irrigation to provide frost protection and eliminate the need for most summer flooding.

Getting into the cranberry business is an expensive proposition. Costs of bringing wild marshland into production may well run $5,000 to $7,000 an acre and beds usually do not produce a commercial crop for 4 to 6 years.

The individual sections or beds in the marsh have to be carefully planned and laid out. The beds have to be scalped of the original vegetation, then leveled, diked, and ditched. New beds are started by planting vines clipped from the old beds.

Cranberry acreage in Wisconsin now exceeds 5,000. This is expected to rise at least 10 percent by 1970.

William Zawistowski, chairman of the Sawyer County Soil and Water Conservation District and a grower, sees cranberry production as having a tremendous effect on the local economy.

"Another important industry in our district is tourism," says Zawistowski, "and here we get another bonus from cranberry marshes. ♦

Poor-paying apple orchard is converted into a busy profitable golf course

A 60-acre apple orchard which didn't make the grade as an apple producer is now the delight of the Yakima Valley golfing dubs and duffers.

In 1964, Bob Schultz bought a 60-acre apple orchard 5 miles west of Yakima, Wash. After 2 years of partially freezing out, he began to think of subdividing it. The contour of the orchard suggested a possible public golf course.

In the mind's eye

Curley Huston, a golf professional from Spokane, walked over the ranch in 1966 with Schultz and visualized the fairways and greens of an attractive 9-hole golf course to be.

Schultz, with technical assistance from the Soil Conservation Service through the Hi-Land Soil and Water Conservation District, removed most of the trees, leaving two to three rows on each fairway as a boundary and buffer zone. He disked and harrowed the fairways periodically until about August to keep down the weeds. He installed a fully automatic sprinkler system with popup heads.

He then seeded a 60–40 mixture of fescue and Marion bluegrass on the fairways and Hi-Land bentgrass on the greens. By mid-October the grass was growing green.

A split rail fence lines the boundaries of the course, and a night-and-day practice range with 24 stalls connected to the driving range completes the facility.

Because the grass wintered very well, the course was ready by April 1967. The opening day was cloudy and cold, but 295 ardent golfers initiated the course. Huston, the course professional, tries to move the players off at 6–8-minute intervals. So far, the weekends have averaged around 280 golfers.

Tree-lined fairways

The most unusual feature of this course is the tree-lined fairways. Huston said he cannot recall ever seeing a golf course with fairways lined with blooming Winesap, Rome, and Delicious apple trees.—DONALD M. GLADSON, *work unit conservationist, SCS, Yakima, Wash.* ♦

Blooming Winesap, Rome, and Delicious apple trees mark the fairways of the Schultz golf course.

Soil surveys used in town, country plans

Well-planned and constructed streets (above), with building sites fitted to topography and soils, enhance residential communities. In contrast, disregard for natural drainage patterns (below) soon creates serious erosion problems.

Many Mississippi counties are using soil surveys developed by the Soil Conservation Service to locate suitable sites for homes, factories, sewage lagoons, streets, and parks. In this way they are eliminating the probability of cracked buildings and streets, flooded homes, and poorly functioning septic tank filter fields.

The Gulf Regional Planning Commission is using general soil maps of Hancock, Harrison, Jackson, and Pearl River counties to develop a comprehensive plan for the Gulf Coast area.

SCS also provided soils interpretations for about 13,500 acres of land in the immediate area of the National Aeronautic and Space Testing Center in Hancock County, for Keesler Air Force Base, Meridian Naval Auxiliary Air Station, and the U. S. Navy Construction Battalion Center at Gulfport.

Brandon, Pontotoc, Ripley, Holly Springs, and Hernando are a few of the towns for which SCS has developed interpretation reports.

Soil interpretations have also been prepared for the Gulf Coastal Flatwoods Area and the Mississippi Delta Area. A soils brochure published jointly by the Soil Conservation Service, the Agriculture Experiment Station, and the State Extension Service, entitled *Soil Surveys in Mississippi—What They Can Do For You,* gives the reader a bird's eye view of what soil surveys are, how they are made, and how they can be used.

A good many contractors, realtors, and engineers are using soil survey information. Builders and public officials are becoming aware that it is usually uneconomic and unnecessary to build homes, factories, schools, and shopping centers on unsuitable soils. Areas underlain by high shrink-swell clays, for example, make unfavorable building sites but are excellent for recreation areas, nature trails, and other uses. Fertile bottom lands may be unsuitable for building sites but excellent for farming.—WILLIAM B. PARKER, *assistant State soil scientist, SCS, Jackson, Miss.* ♦

Carrying on a long tradition . . .

Soil Stewardship Week

The idea behind Soil Stewardship Week has ancient roots. The concept of man's stewardship for the land appears in many religions, many cultures.

The custom of setting aside special days to give thanks for the precious gifts of soil and water, air and sunshine, began more than 1,500 years ago, in Vienne, France.

In 452, Vienne experienced a year of bad weather and earthquakes, which resulted in serious crop failures and widespread hunger.

The Bishop of Vienne called for prayers and penance for the 3 days preceding Ascension Day. Other communities took up the observance, and the custom of Rogation Days spread throughout Europe and eventually came to Colonial America.

Rogation days became a time of giving thanks to God and of asking his help and mercy. The custom recognized that food was provided by neither the earth alone nor the industrious hand of man. It came also from the bounty of God, and so it was fitting to thank Him for His grace.

"Perambulation"

During England's Elizabethan period, the custom of "perambulation" came into vogue. In this observance, the members of the congregation accompanied the clergy at Rogationtide in walking around the whole parish. Queen Elizabeth designated that the 104th and 112th Psalms be recited during the procession.

Izaak Walton, apparently referring to his local vicar, wrote: "He would by no means omit the customary time of procession, persuading all, both rich and poor, if they desired the preservation of love, and their parish rights and liberties, to accompany him on his perambulation." This custom was observed in America during colonial days.

In America, the observance of the fifth Sunday after Easter, Rogation Sunday, as "Rural Life Sunday" was launched at a meeting of the International Association of Agricultural Missions in 1929. At that meeting, a resolution was adopted urging the Home Mission Council, the Foreign Mission Conference, and the Federal Council of the Churches of Christ in America to further its observance. During the 1930's, various church services, in their own way, recognized the importance of soil stewardship.

"Soil stewardship"

The first "soil stewardship" observance was held on Sunday, July 21, 1946. It was prompted by A. B. Kennerly, editor of *Farm and Ranch* magazine. This observance was referred to as "Soils and Souls Sunday." His successor, H. L. Gantz, had a similar interest in the growing observance.

When Soils and Souls Sunday was observed on June 29, 1947, the magazine provided kits of literature and references to assist ministers in preparing sermons.

The first national soil stewardship observance occurred May 2, 1948. Still under *Farm and Ranch* magazine sponsorship, the observance was included in "Friends of the Land Week" and was called "Soil and Soul Sunday."

During these observances, the terms "soil stewardship" and "stewardship of the land" appeared more and more frequently in sermons and literature. In 1950, the day was renamed "Soil Stewardship Sunday."

Interest in Soil Stewardship Sunday grew in the South and in the Southeast. *Farm and Ranch* issued a booklet of selected conservation sermons and other materials for use on the May 21, 1951, observance. Meanwhile, the then SCS regional office in Albuquerque, N. Mex., in response to requests from clergy, circulated materials for the 1951 observance in New Mexico, Colorado, Arizona, and Utah.

National observance

Farm and Ranch continued to sponsor the observance and to distribute booklets and materials during 1952, 1953, and 1954. Because the movement was becoming so widespread, its editor decided that sponsorship of the Sunday should be taken over by a national organization.

Since the inception of Soil Stewardship Week, the National Association of Soil and Water Conservation Districts (NACD) had been especially interested in the advancement of this week as a national event and undertook its national sponsorship in 1955.

An advisory committee of churchmen from several denominations played a significant role in the observance, especially in helping the NACD Soil Stewardship Committee produce informational materials and distribute them to local conservation districts and to church groups. These materials included booklets, church programs, inserts, and posters. From 1958 to 1962, a film was distributed.

Soil stewardship activities

Tours, workshops, and many other activities are planned for Soil Stewardship Week by conservation

districts and other organizations interested in the event. The following examples are typical:

During Soil Stewardship Week of 1966, the Macon County Soil Conservation District of Illinois invited its city dwellers to make a "drive-it-yourself" tour of the countryside. Maps of the route were prepared and distributed. Signs pointing to conservation work on the land were erected. The route was planned to include scenic areas and to show examples of the conservation work landowners were doing.

The Mitchell Soil and Water Conservation District of Texas sponsored a tour for ministers in 1967. A county supervisor of the Farmers Home Administration discussed some of the changing aspects of local farming and ranching. The group observed parallel terraces and conservation cropping systems. "America The Beautiful" slides were shown.

About 60,000 booklets, 600,000 church programs, 1,700,000 inserts, and 12,000 posters are distributed annually by NACD.

NACD's support of Soil Stewardship Week has been to emphasize the citizen's responsibility for the conservation and orderly development of natural resources, focusing attention on recognition of man's responsibility under God to protect and use wisely His precious gifts of soil and water.

NACD is a nongovernmental organization of more than 3,000 conservation districts and their 50 State associations. It has published 12 booklets on Soil Stewardship Week.

NACD stewardship leaders

Several NACD leaders have taken special interest in Soil Stewardship Week. David J. Doneen of Washington, a director of NACD from 1950 to 1955, was chairman of NACD's Soil Stewardship Committee from 1955 to 1960. Mr. Doneen is a wheat rancher and currently a member of the Department of Agriculture's Public Advisory Committee on Soil and Water Conservation.

Oscar Laper of Wisconsin was chairman of NACD's Soil Stewardship Committee from 1961 to 1965. Newton Layton of New Jersey became the chairman in 1966.

The late Waters Davis, a Texas rancher and past president of NACD, was a strong supporter of Soil Stewardship Week.

The NACD Soil Stewardship Advisory Committee since 1963 has included the following members:

The Rev. E. W. Mueller of the National Lutheran Council, who is also member of the Faith-Man-Nature Group. Dr. Mueller was a member of the original advisory committee in 1955 and has been a member ever since.

The Rt. Rev. John George Weber of the National Catholic Rural Life Conference.

The Rev. Lewis Newman of the Southern Baptist Convention.

The Rev. Harold Huff of the Methodist Church.

The Rev. Henry McCanna of the National Council of the Churches of Christ in the U. S. A.

Members of the advisory group meet with NACD leaders twice a year to decide on the subject for the next year's booklet, and to examine the whole concept of soil stewardship in detail. ♦

Meetings . . .

National Watershed Congress forum

The National Watershed Congress presents as its theme "New Dimensions in Watershed Management" at its annual forum on May 26–29 in New Orleans, La.

In keeping with the theme, the keynote address will be "Competitive Demands: The Growing Need for More Effective Systems of Identifying Alternatives and Making Choices in Watershed Development."

An address, "Watershed Development and the Rural Environment," will be given in session 4.

Sessions 2, 3, and 5 will be panels with presentation of special papers in sessions 3 and 5. "The Demand for Water Reuse: The Coming Importance of Renovation and Re-Cycling" will be the subject of a special paper in session 3 and "The Shrinking Timetable for Watershed Development" in session 5.

Illustrated presentation of the story of the 1967 Watershed-of-the-Year and 1968 awards for the Watershed-of-the-Year and the Watershed Man-of-the-Year will take place in session 6.

There will be a tour on May 29 to the "Mouth-of-the-Mississippi."

Dates and places

May 1–2, Southern Forestry Conference, Jacksonville, Fla.

4–9, American Society of Planning Officials, San Francisco, Calif.

13–17, Environmental Engineering Conference, Chattanooga, Tenn.

14–17, The Garden Club of America, Greenwich, Conn.

16–19, American Agricultural Editors Association, St. Paul, Minn.

19–25, Soil Stewardship Week

26–29, National Watershed Congress, New Orleans, La.

26–30, Urban Land Institute, Atlanta, Ga.

June

2–7, American Water Works Association, Cleveland, Ohio.

4–7, National Rivers and Harbors Congress, Washington, D. C.

9–12, American Seed Trade Association, Chicago, Ill.

9–14, General Federation of Women's Clubs, Boston, Mass.

15–22, Outdoor Writers Association of America, Inc., Gardens, Ga.

19–21, American Society of Agricultural Engineers, Logan, Utah.

23–27, National Association of Sanitarians, Washington, D. C.

23–26, American Institute of Architects, Portland, Oreg.

28–29, American Institute of Architects reconvenes in Honolulu, Hawaii.

30–July 2, Newspaper Farm Editors of America, Denver, Colo.

30–July 5, National Education Association, Dallas, Tex. ♦

Review

Changing Patterns of Fertilizer Use. By Various Authors. *1968. Soil Science Society of America, Madison, Wis. 466 pp., illus. $7.50.*

In this book 34 authors, mainly specialists in soil fertility, present the papers given at a symposium held in Chicago in February 1968. The result is an authoritative, up-to-date statement on the uses of various kinds of fertilizers in the United States for a wide variety of crops, along with some regional adaptations; how fertilizers are marketed; methods of testing soil needs for fertilizers; methods of application; and a little about the economics of their use. In addition a bit of the historical and scientific backgrounds of these topics is included.

A general soil scientist would have given much greater emphasis, perhaps, to the interactions of fertilizer use with the other basic farm practices that contribute to yield and efficiency. Curiously, two wide uses of soil classification and soil maps are scarcely mentioned: (1) To sharpen the interpretations of soil test results, and (2) to suggest the potential responses of the many contrasting kinds of soil to intensive management systems that include fertilizer.

The book will be highly useful to those readers who already understand the additional principles necessary to apply the valuable information that is presented.—Charles E. Kellogg, *deputy administrator for soil survey, SCS.*

The People Left Behind. By the President's National Advisory Commission on Rural Poverty. *1967. (Govt. Print. Off.) Washington, D. C. 160 pp.; paper. $1.00.*

This report by the commission, headed by Gov. Edward T. Breathitt of Kentucky, is a comprehensive study of the existence of poverty and community problems in rural America.

The report takes into consideration such factors as status of rural labor, training and retraining, availability of land resources, adequacy of nutrition, housing, health, and cultural opportunities, status of rural youth, impact of rural migration, exploration of new and better means to combat the causes that perpetuate rural unemployment, and other related matters.

The report makes specific recommendations for action by local, State, and Federal governments, along with private enterprise, to provide opportunities for the rural population to share in America's abundance.

The Advisory Commission is convinced that the abolition of rural poverty in the United States is completely feasible. This Nation has the economic resources and technical know-how for doing this. The commission rejects the view that poverty in so rich a Nation is inevitable for any large group of its citizens.

The Advisory Commission's report is must reading for conservationists and others concerned about problems of the poor and how to improve their economic status, whether in the urban or rural areas.—James F. Hughes, *soil conservationist, Resource Development Division, SCS, Washington, D. C.*

Soil Testing and Plant Analysis. Edited by Glenn W. Hardy. *1967. Soil Sci. Soc. Amer. Spec. Publ. 2. Madison, Wis. In two parts:*

Part I. Soil Testing. *157 pp., illus.; paper. $2.00.*

Part II. Plant Analysis. *114 pp., illus.; paper. $2.00.*

These special publications contain papers on soil testing and plant analysis that should be useful to people providing these services to the public. They should also bring understanding to the users of test results of how they can be used to influence crop production.

These papers provide a fairly good cross section on basic philosophy, methodology, and limitations of soil testing and plant analysis. They point up the need for additional research to improve laboratory methods and clarify the correlation of analysis with field situations for crop production.

The papers have been published previously; this collection brings them together for convenient reference. Each paper contains an exhaustive list of references on its subject.—Louis E. Derr, *Soil Survey Operations Division, SCS, Washington, D. C.*

The Christian Encounters Town and Country America. By Giles C. Ekola. *1967. Concordia Publishing House, St. Louis, Mo. 123 pp.; paper. $1.25.*

This little book seeks to relate the concerns of the church to modern life in "town and country," i.e., in nonmetropolitan areas. The author, being on the staff of the Lutheran Church in America, naturally expresses the theological viewpoint of that church. It is a philosophy familiar to many soil conservationists through the work of his associate, the Rev. E. W. Mueller, who for many years has served on the Soil Stewardship Advisory Committee of the National Association of Soil and Water Conservation Districts.

Chapters on community development, outdoor recreation, and especially the one on land and water, deal with subjects of primary concern to the Soil Conservation Service.—B. O.

Land Use Principles: A Reading and Discussion Guide. By Ben Osborn. *1968. USDA Graduate School Press, Washington, D. C. 39 pp. $1.25.*

This modest but excellent little treatise was developed for classes in the USDA Graduate School conducted in cooperation with the Audubon Naturalist Society, Washington, D. C. The treatise grew out of 9 years of field and class work

and is a model of its kind. Although designed primarily for the use of classes and study groups interested in the subject, the booklet has considerable value for the individual interested in improving his knowledge and concepts of land use.

The reading and discussion outline offers a series of subjects, each with suggested reading. The subjects deal with the esthetic and ethical, economic, political, social, ecological, and physical aspects of land use. There is consideration of urban and suburban uses, land use planning, watersheds, river basins, and finally, general principles.

A third section contains 70 principles summarizing in brief, clear statements the seminar and class discussions of the readings outlined, plus a selected list of definitions of conservation. The Guide is a *must* for anyone working in, or interested in, conservation as applied to the use of land.—W. R. VAN DERSAL, *deputy administrator for management, SCS.*

New publications

Conservation Plantings . . . Invite Birds to Your Home. *1968. USDA PA-840. 16-page illustrated folder in color. $0.20.* Bird's appetites lean toward "berried treasure," and their favorite berries are usually bright-hued and decorative. Their needs for shelter are met by hedges and other dense shrubbery that can fit handsomely in the backyard scene. Trees for songbird concerts and nest building also provide welcome shade and ornamentation for the human householder. The sylvan pool or pond built to serve the wildlife community also serves as a recreation area. Some of the plants listed in the folder are: Amur honeysuckle; crabapple; firethorn; autumn olive; holly; silky gray-stemmed, redosier, and flowering dogwood; highbush blueberry; sumac; cherry; mountain-ash; hawthorn; redcedar; American cranberrybush; bittersweet; tatarian honeysuckle; and Virginia creeper.

Let's Try It: Conserving Our Natural Resources. *1967. Girl Scouts of the U.S.A., New York. 23 pp.* Lists and brief descriptions of girl-sized projects in conserving trees, wild flowers, water, wildlife, and soil; outdoor good turns; and other information useful to youth leaders.

Our Native Land. *No date. National Association of Manufacturers, New York. 47 pp., illus.* An updated version of "a basic handbook on conservation through wise use and management of natural resources" presents, from the viewpoint of American industry, the needs for conservation and reports on progress being made. It concludes with a statement of NAM policy on conservation and management of natural resources. Copies are available from the association.

Surface Drainage of Flatlands. BY IRWIN L. SAVESON. *1967. USDA Misc. Publ. 1062. 10 pp., illus. $0.10.* Two systems, the cut crowning system and the land-forming system, are recommended for surface drainage. The cut crowning system is used for the production of sugarcane, vegetable crops, and pasture; the precision land-forming system in the production of all crops except rice and pasture.

National Resources of Indiana. *1967. U.S. Dept. Interior. 52 pp., illus. $0.45.* Another in the series of beautifully illustrated booklets about the resources of each of the States. In addition to being an agricultural and industrial State, Indiana has water and power, mineral resources, fish and wildlife, and outdoor recreation.

Underwater and Floating-Leaved Plants of the United States and Canada. BY NEIL HOTCHKISS. *1967. U.S. Dept. Int. Resource Publ. 44. 124 pp., illus. $0.65.* An identification manual, illustrated with exceptionally clear line drawings, most of them life-size, of an important group of aquatic plants.

Zoning—an Aid to Community Resource Development. BY E. C. WEITZELL. *1967. USDA PA-814. 15 pp., illus. $0.15.* A guide to understanding the objectives and process of land use zoning and related functions of local government.

Soil surveys

Houston County, Alabama. BY DWIGHT M. HARRIS, JR. *1968. 72 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Dwight M. Harris, Jr., Glenn L. Hickman, John H. Hataway, and Lewis A. Dungan.

Dougherty County, Georgia. BY ROYCE G. MIDDLETON. *1968. 64 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by Royce G. Middleton, Marion M. Blevins, Ernest H. Smith, Russell O. Neal, and W. S. Carson.

Pike County, Mississippi. BY ALLEN C. MILBRANDT AND L. BROOKS HALE. *1968. 62 pp., illus.; maps 4 inches to the mile (1:15,840).*

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From the Administrator:

The Meaning of Soil Stewardship

Soil Stewardship Week is a significant recognition of man's obligation to the natural and spiritual worlds of which he is a part.

I believe its importance will greatly increase as we become an ever more urban Nation. People living on the land are reminded of the importance of soil every day they work in the fields. Urban people need forceful formal reminders that their stake in good stewardship is just as vital.

Now, what does a soil steward believe, and how does he express that belief?

I think stewards recognize that land and water are not products of *our* labor, but gifts of God, under our stewardship. Anyone who uses these gifts has a moral responsibility to use them wisely. Men on the land, and in decision-making positions with respect to land use, have a direct and immediate responsibility. Good land use should be the natural result of sincere stewardship.

Men come to this recognition, and the resulting action, through different paths, depending on their experience. A farmer may see it through his work on the land; a philosopher through his reading; a theologian through his religious beliefs and experiences; an historian through his studies of past civilizations; an artist through his eyes.

The results will vary. A landowner will improve his land; a businessman will consider nondollar and conservation values in land use for himself and his community; a writer will reflect his perceptions in his work; a religious man will reflect it in his whole life.

Today, we know in large degree the facts of how to keep our soil in good condition. The question is not knowledge but desire. Do we *desire* to keep our basic resources of soil and water in good condition? Do we desire it enough to pay the cost in money, in patient planning, in emotional restraints?

Do we, in short, have enough of a feeling of stewardship to look upon the soil as a loan to be passed on to another generation? Do we realize that the interest on this magnificent loan is the good use of the land while it is in our hands? Do we realize that this loan can be withdrawn for failure to pay the necessary interest, both literally and figuratively, of good land care?

These are matters of attitude and emotion. To a larger extent than many scientists wish to admit, they determine what we, as a Nation, will do with our land.

The spirit of responsible people at work on the land will lay the land to heart. The spirit will nurture man's concern for man. The spirit will be tested in our use of fields and streams. The spirit acknowledges that soil stewardship has no time limits. There is not a moment when a steward can step back and say of his handiwork: "This is complete." He knows that the contours must be plowed year after year . . . the terraces kept in repair . . . the crops rotated . . . the watershed dams inspected.

The spirit of a responsible people does not disappear as we approach the city limits. The spirit is shown by the Nation's attitude toward conservation. It is shown in the halls of Congress . . . in suburban planning councils . . . in the voting booth. More fundamentally, it is shown in our sense of personal responsibility for soil stewardship.

The spirit is the animator behind our actions.

What then, is the reward of the steward?

The reward is a sense of responsible contribution to the future, a sense of working with nature as it moves in cycles. The steward knows the planted seed must precede the harvest. The summer-built terraces must precede the spring protection from storms. The autumn corn must precede the winter feed.

The reward of the steward is seen in the beauty of the countryside and the strengthening of his community.

Finally, the reward of the steward is in self-respect; a feeling he has given his time and talent to something worthwhile.

Three-fourths of our land is owned or operated by private citizens, so they are the primary stewards. Since the bounty of the land is shared by rural and urban people alike, the responsibility for the land falls not only on farmers and ranchers who make up less than 7 percent of our population, but also on the 93 percent in towns and cities. As this urban trend continues, more and more of the stewardship responsibility must shift from the man behind the tractor to the man behind the desk.

We have, in our history as Americans, made giant strides across the land. Now we must retrace our steps and look at the land with new eyes—the eyes of stewardship, in which use and responsibility are seen as the unbreakable ties that bind us to nature.

We will serve best what we love the most, for the desire to serve is founded on love. The desire to serve has made many of us dedicate ourselves more fully to God, to fellow men, and to the care of the natural resources we have inherited. There is a kinship here, for in service to one, we find reason for service to the others.

D. A. WILLIAMS

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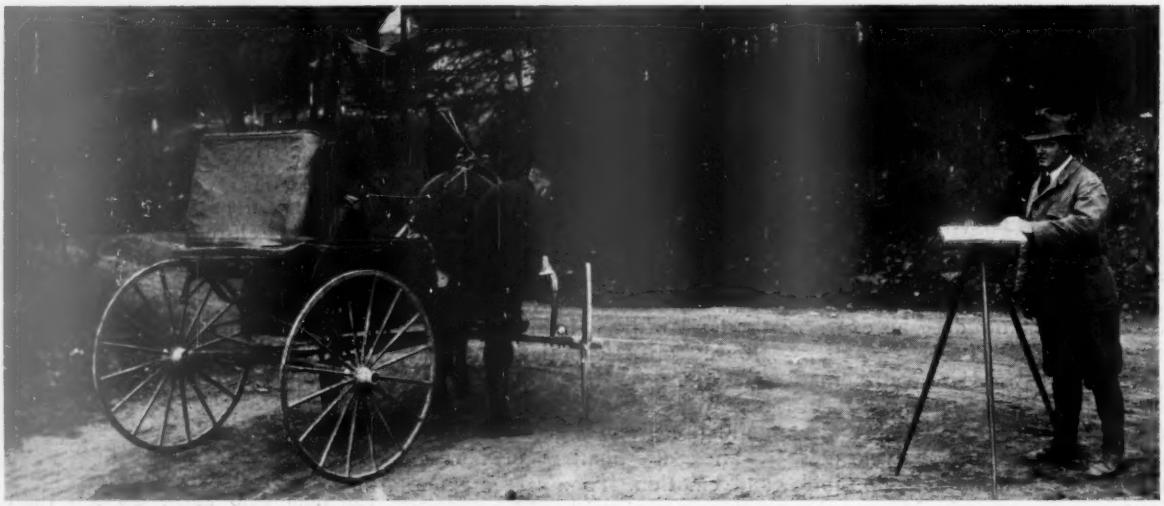
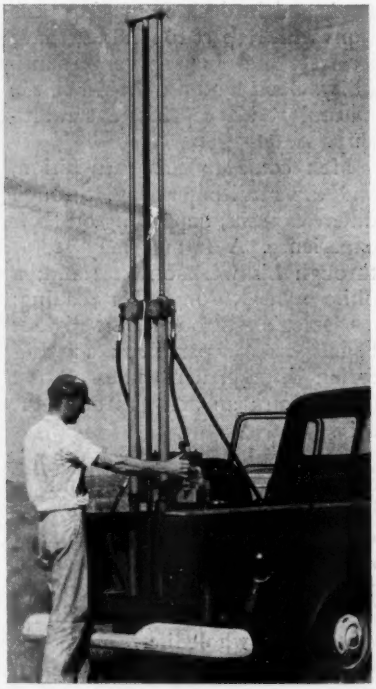
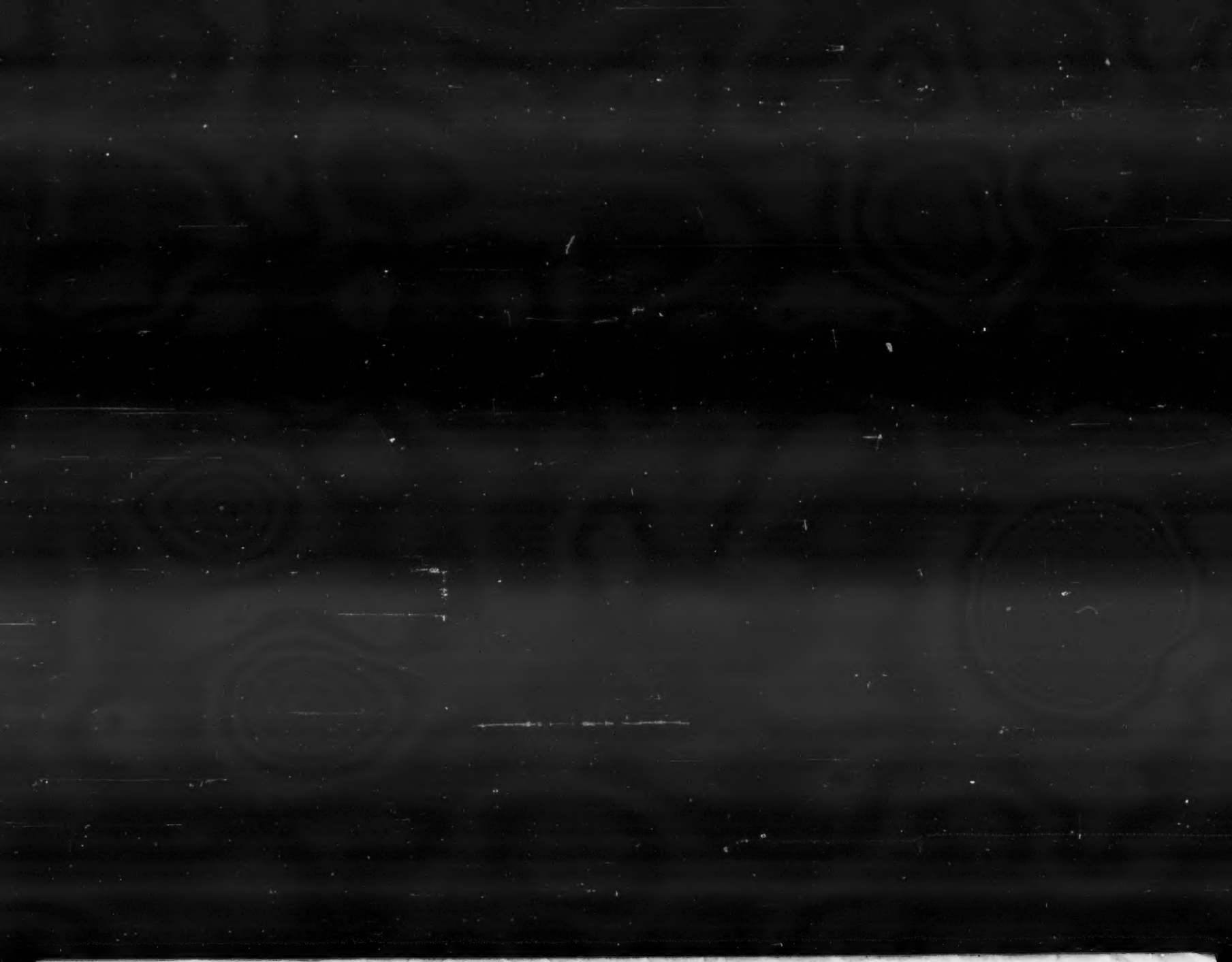


Then— and Now in soil surveys

When soil scientists began to make soil surveys, they borrowed from the field methods of geology and the laboratory methods of chemistry. Since then, soil science has developed its own quantitative methods. Modern equipment and technology have made great changes in the work of the soil scientists in the field.

Then (in 1910, above), the field equipment consisted of a simple soil auger, a buggy fitted with an odometer to measure distances, and a planetable on which the fieldman plotted soil boundaries and other physical features of the landscape that users can see.

Today, the soil scientist uses motor vehicles for transport, mechanical equipment for digging (power soil sampler, far right), portable scientific equipment for some determinations formerly possible only in the laboratory (soil acidity, left), and good airphotos on which to plot soil boundaries with great precision.♦